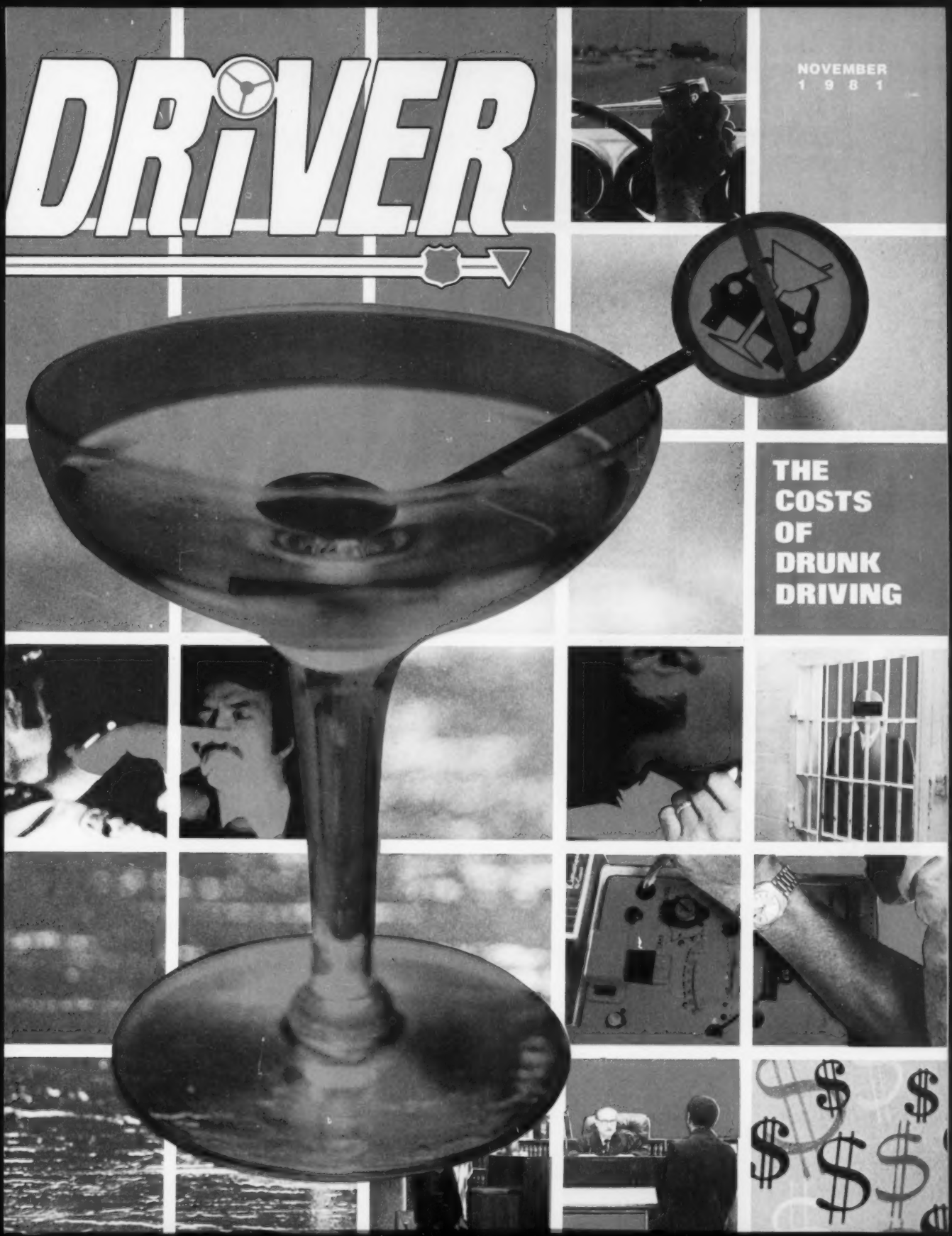

DRIVER
NOVEMBER
1 9 8 1
THE
COSTS
OF
DRUNK
DRIVING

DRiVER

A conviction for driving under the influence of alcohol can hit you hard — in the bank account.

Our thanks to the California Highway Patrol for the "No Driving Under the Influence" emblems used in the photos.

the COSTS of DRUNK DRIVING

Reach into your wallet and take out $3500. Give it to the first person who walks by and say "Have a nice day!" Now continue your daily routine and buy some gasoline, a couple of bags of groceries and the latest Spasmodics cassette for your tape deck. Then go off for an evening of dinner with your honey, a movie and maybe some coffee afterwards.

What's wrong with that scene? You don't like the Spasmodics? You never go to the movies on weekdays? Or maybe you're not in the habit of giving away large sums of money to strangers. If you did, you might mess up your grocery budget for the next whole year.

Yet that amount, or some similar figure, is what you'd be "giving away to strangers" for fines, lawyer fees, insurance and the like, if you were convicted of drunk driving.

That rough figure is one we got by talking to some insurance companies, the San Bernardino (California) County Department of Public Health, and the Court School of Understanding Addictions, a local court referral program for drunk driving offenders. Fines and penalties for drunk driving vary widely across the country so the figures we present here are localized, and are only for purposes of illustration. The costs for your area will be different, but whatever the amount, it will be more than you can easily afford to "give away." Also, this is a "worst case" example. When you talk about penalties, it's always wiser to look at the bad side.

If you were stationed here and were convicted of driving under the influence of alcohol (DUI), the fine would be $372.50. (This is a simple DUI case, without collision, injuries or deaths.) Add to that the court costs of $91. Bail to get you out of the slammer is $48.50, and it is not deducted from the fine.

When you were arrested your car would be impounded. Getting it out

continued

Drive fulla booze
Pay your dues

Drive fulla wine
Pay your fine

Drive fulla beer
Spend a night in the slammer
(and all of the above)

DRIVER

THE
TRAFFIC SAFETY MAGAZINE
FOR THE MILITARY DRIVER

DEPARTMENT OF THE AIR FORCE
HQ AIR FORCE INSPECTION AND SAFETY CENTER
Norton Air Force Base, California 92409

Hon VERNE ORR
Secretary of the Air Force

Lt Gen HOWARD W. LEAF
The Inspector General, USAF

Maj Gen HARRY FALLS, Jr.
Commander
Air Force Inspection and Safety Center

Brig Gen LELAND K. LUKENS
Director
Aerospace Safety, USAF

PUBLISHED MONTHLY IN COOPERATION
WITH
THE DEPARTMENT OF THE ARMY
AND
THE DEPARTMENT OF THE NAVY

Dr. FRANCIS S. McGLADE
Director of Safety
United States Army

RADM T.C. STEELE, Jr.
Commander
Naval Safety Center

AFRP 127-1

Entered as a publication at the Second-Class rate (USPS No. 586-430) at San Bernardino Postal Service, 1331 South E Street, San Bernardino, CA 92403.

Authority to publish this periodical automatically expires on 29 January 1982 unless its continuance is authorized by the approving authority prior to that date.

SUBSCRIPTION — DRIVER is published monthly and is available on subscription for $13.00 per year domestic ($2.25 per copy); $16.25 per year for foreign mailing ($2.85 per copy), through the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Back issues are not available. Changes in subscription mailings should be sent to the above address. Use of funds for printing this publication has been approved by Headquarters, United States Air Force, Department of Defense, Washington, D.C. No payment can be made for manuscripts submitted for publication. Contributions are welcomed, as are comments and criticism. Address all correspondence to the Editor, DRIVER Magazine, HQ AFISC/SEDD, Norton AFB, CA 92409.

Distribution: One copy for every 9 members of USAF.

ATTENTION DEPT OF THE NAVY PERSONNEL: Address all queries concerning distribution to NAVSAFECEN, NAS NORFOLK, VA 23511, Attn: Safety Publications Dept. All other correspondence will be welcomed by the Editor.

The purpose of this magazine is the prevention of vehicle accidents, and the contents are not directive unless so stated. Address reprint requests, stating intended use of material, to the Editor. The Editor reserves the right to make any editorial changes in manuscripts which will improve the material without altering the intended meaning.

The inclusion of names of any specific commercial product, commodity, or service in this publication is for information purposes only and does not imply endorsement by the Air Force.

Certain individuals shown in this magazine are not members of the Air Force and therefore do not conform to Air Force grooming standards.

NOV

VOLUME 15 NUMBER 6

CONTENTS

Features

The Costs of Drunk Driving — 1

Glossary — 8

Respect The Motorcyclist — 10

Futurecars? — 13

"Go Down This Freeway . . ." — 14

Carburetor Fires — 27

Intersection Interlude — Back Cover

Departments

Too Close For Comfort — 7

Timely Topics — 12

Double Tech — 20

The Backyard Mechanic — 22

Backfire — 28

COL. WARREN L. BUSCH
Chief, Safety Education Division

VIRGINIA HENDRIX
Editor

TSgt RON LATHROP
Technical Editor

JERI ROOD
Feature Editor

ALICE MILKEY
Editorial Assistant

DON KELLEHER
Art Director

LORRAINE HAMBLEN
Staff Artist

CLIFF MUNKACSY
Staff Photographer

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION
The United States Postal Service requires that all publications publish a statement of ownership, management and circulation.

Title of Publication — DRIVER

Publication No — 586-430

Frequency of Issue — Monthly

Location of Office of Publication — HQ AFISC/SEDD, Bldg 918, Norton AFB CA 92409.

Publisher — U.S. Air Force

Editor — Virginia A. Hendrix

Owner — Air Force Inspection and Safety Center, Bldg 918, Norton AFB CA 92409.

Total No. Air Force copies printed — 60,875

No. Air Force copies distributed — 60,625

No. copies not distributed — 250

Total Air Force copies distributed and not distributed — 60,875

the costs of drunk driving

continued

would cost $34.50. You're already up to $546.50. If you got a lawyer to try to have the charge reduced to reckless driving, you would pay at least $650, perhaps as much as $1200 or even more.

So now you're facing $1196.50, or perhaps as much as $1746.50. Some localities, San Bernardino among them, require people convicted of drunk driving to attend an educational course on the hazards of alcohol and automobiles, in addition to the fine. The Court School of Understanding Addictions, a four-month course that meets three times a week, costs the offender $150. This may or may not be deductible from the fine, on the judge's decision. That makes the low amount $1046.50, and the high $1896.50.

High premiums: Unfortunately for the pocketbook of the drunk driver, that's not the end. The insurance charges can be the worst part. First, after it finds out that you've had a drunk driving conviction, your insurance company will very likely cancel your insurance. Those companies that do not automatically cancel will raise the premiums considerably.

Here in California, those convicted of drunk driving can get insurance under the Assigned Risk Plan. Under the plan, they pay higher premiums for reduced coverage to companies who have agreed to take them on. The procedures in your state will be different, so we won't go into detail, but we will give you some representative figures.

For our purpose, we gave the insurance companies a fictitious airman, aged 20, who drives a 1974 Chevrolet Camaro. The cost for insurance for such an individual varied from about $400 all the way up to nearly $800 for the bare minimum of liability coverage required by state law. All but one of the companies told us they would cancel the insurance of anyone who was convicted of driving under the influence of alcohol. The one that didn't automatically cancel would add a hefty surcharge onto the premiums.

We visited an independent agent to find out about the premiums under the Assigned Risk Plan. First, before the DUI conviction, our hypothetical 20-year-old airman with the '74 Camaro would pay $260 annually for the minimum insurance, a better price than with the major companies. After the DUI, his premiums would be $540 a year for three years, then they would drop to $450 a year for another four years, still better than some of the majors. However, the DUI has cost him a lot of money.

We'll save you the arithmetic: That's an additional $280 for three years and then an additional $190 for four more years, for a total of $1600 over the seven-year period, just for minimum insurance.

Again for purposes of illustration, let's add that hypothetical figure to the fines and lawyer fees. Now the total bill for that one DUI episode is somewhere between $2646.50 and $3496.50. We realize this is spread out over several years and therefore wouldn't hit all at once, but it is still money that you would otherwise have been able to spend on yourself.

Even if we used the lower figure, how many house payments could you make on $2650? How many car payments? What kind of motorcycle

continued

continued

could you buy for that amount? How much stereo equipment and how many records could you get for $2650?

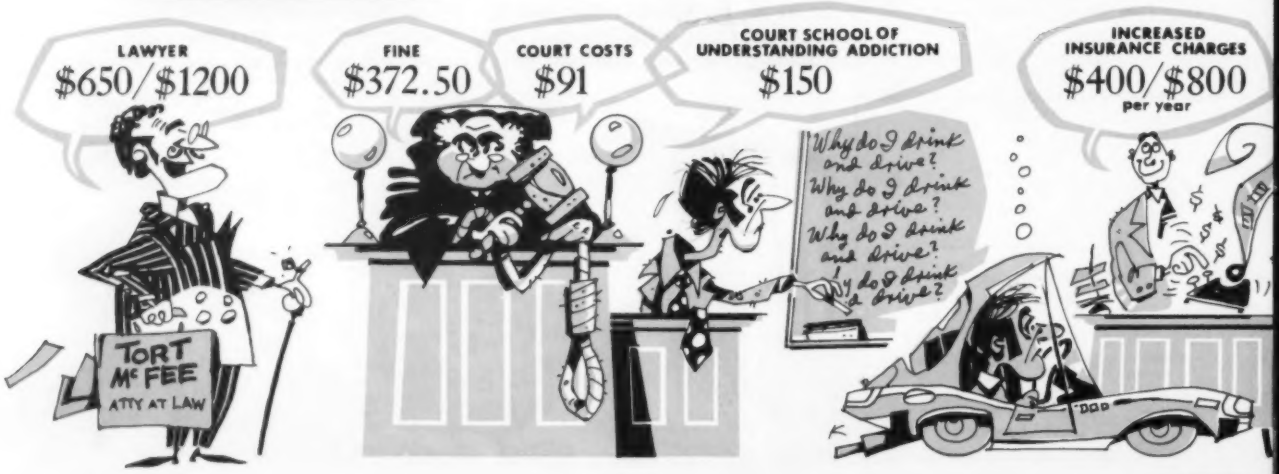
A couple of notes are needed here. First, these figures are conservative. The cost to you could be much higher. Second, these are only true for the first offense. On a second drunk driving conviction you would most likely lose your license for a year, and the fines would definitely be much higher.

So those are some of the things we can put prices on, although the prices are of course estimates. Now try putting a price tag on some of the other costs. You will be away from work while you're in court handling the charge. You will suffer the hassle of being in the city's drunk tank for a few hours or a night. You will probably get a lot of "counseling" from your boss.

Driving while drunk just isn't worth it.

How did I get here? So those are the costs of being nailed for drinking and driving. How do you reach the point where the police will arrest you on a DUI? In most states, a person reaches the point of intoxication when he has .1 percent of alcohol in his bloodstream (one part alcohol for every 1000 parts blood). Experts call the amount of alcohol in the system the Blood Alcohol Level (BAL) or Blood Alcohol Content (BAC).

Several factors determine what your BAC will be. Of course, the most important factor is how much



you drink. If you drink a lot in a short time, the BAC will be higher and it will rise faster.

Physical size of the person also affects his BAC. A larger person can take in more alcohol, simply because he has more blood in his system.

The speed at which a person drinks also determines the BAC. This is because your body can get the alcohol out only at one steady rate. The human liver can only detoxify about a third of an ounce of pure alcohol each hour. (This does *not* vary by the weight of the person. If you're a large person you may be able to drink more alcohol than the little guy before you get drunk, but you sober up at the same rate as the smaller person.)

The presence of food in the stomach will affect BAC, too. Food in the stomach slows down the absorption of alcohol into the system.

The kind of alcohol you drink doesn't have much of an effect on BAC, contrary to popular opinion. A can of beer or a glass of wine contains as much pure alcohol as a shot glass of whiskey. The alcohol in wine and beer acts a little more slowly because it is diluted more than in the whiskey, but not much more slowly.

So, since the kind of alcohol doesn't count for much, we can provide a chart (on page 6) to tell you how much you can drink, based on the amount you drink, the time and your body weight. Take a look at it and pick out your weight. We'll say you weigh 160 pounds for this discussion. Our chart shows you could drink five drinks (beer, wine or spirits) on a full stomach in one hour before you reached the level of .1 BAC.

Caution: Five drinks per hour is not your "limit." Your Blood Alcohol Content goes down very slowly.

continued

ANTI-DRUNK DRIVING LEGISLATION

What's that? You say you don't believe in the "worst case" figures? Well, penalties for drunk driving may get a lot stiffer if legislation in Congress passes.

Senator Claiborne Pell of Rhode Island and Rep. Michael Barnes of Maryland have introduced bills in their respective houses to require states to pass tougher anti-drunk driving laws or risk losing their federal highway safety funds.

The bills would require that those convicted of drunk driving be sentenced to 10 days of community service in addition to fines and alcohol treatment programs, and that they would have their driver's licenses suspended for up to one year.

Those convicted of drunk driving two or more times in five years would get a minimum sentence of 10 days in jail and a revocation of their driver's licenses for at least a year.

Citizen's groups such as the Mothers Against Drunk Drivers (MADD) are also

pushing for such legislation. The MADD group used its influence to achieve some tough new drunk-driving laws in California this past September. In that state, a first offender may no longer be punished with just a fine. He must spend a minimum of two days in jail or have his license suspended.

Also in September, Maine passed a law that looks even tougher. If a police officer in Maine stops a driver suspected of being under the influence of alcohol, a blood-alcohol test is mandatory. If the test shows less than .2 it's a civil offense punishable by an automatic $250 fine and 60-day suspension of driving privileges. However, if the driver's attitude is belligerent, the officer may exercise his own judgment and make the infraction a criminal offense. Should the blood-alcohol test show over .2, the officer must call it a criminal offense. That automatically requires 48 hours in jail, a $350 fine, and a 90-day suspension of the license even if it's a first offense.

We think plea bargaining is going to get tougher everywhere. That's where your lawyer gets the charge of drunk driving reduced to a lesser charge such as reckless driving or even improper lane change. We'll keep you informed on the new legislation in other states as well as the congressional action.

continued

In fact, it drops much slower than most people drink. That's why most people just get more drunk as the evening goes on.

Lowering the BAC: We said the human liver detoxifies alcohol at one steady rate. It will work on about a third of an ounce of pure alcohol each hour. Each drink (of whatever kind) contains about six tenths of an ounce of pure alcohol. So this amount could be eliminated from the body in about two hours. Or, to look at it another way, BAC drops about .015 each hour.

But let's go back to our imaginary 160-pounder. If he drinks two drinks in an hour, his BAC reads .03. If he has two more in the next hour, he will reach .06 BAC (see "4 drinks after 2 hours" on the chart). Two more drinks the next hour will push it up to .09 ("6 drinks after 3 hours"), and still another couple of drinks will put him over the legal limit at .13 ("8 drinks after 4 hours").

He's losing ground. Two drinks an hour is too many. If you look at the 200-pound line on the chart, you see that two drinks an hour is too many for even a large person. The only safe way is to stick to only one drink per hour, or less if you're a lighter person.

Look at it this way: That extra drink could cost you $3500, and a whole lot of trouble.

OTHER COSTS

The personal dollar costs of drinking and driving should be enough to convince you to moderate your intake. However, there are other costs that are even more dramatic.

50,000 Americans die in traffic accidents every year. Half of these, about 25,000, die in accidents involving drunk drivers. That makes about a quarter of a million deaths over the past decade. Nearly 70 people are killed each day by drunk drivers, or about one ever 23 minutes.

The Federal Bureau of Investigation says 1.3 million DUI arrests were made last year — more than two every minute.

The cost to society associated with drunk driving is over $5 billion a year.

BAL CHART

	1 Drink				2 Drinks				3 Drinks				4 Drinks			
After hours	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1
Weight pounds																
80	—	—	—	.02	—	—	.05	.08	.07	.10	.10	.10	.12	.12	.15	.15
100	—	—	—	.02	—	—	.04	.06	.05	.07	.08	.09	.09	.10	.12	.13
120	—	—	—	.02	—	—	.03	.04	.03	.04	.06	.08	.06	.08	.09	.11
140	—	—	—	.01	—	—	.02	.04	.02	.03	.05	.06	.04	.06	.08	.09
160	—	—	—	.01	—	—	.02	.03	.01	.02	.04	.05	.03	.04	.06	.08
180	—	—	—	.01	—	—	.01	.03	—	.02	.03	.04	.02	.04	.05	.07
200	—	—	—	—	—	—	.01	.02	—	.01	.03	.04	.01	.03	.04	.06
	5 Drinks				**6 Drinks**				**7 Drinks**				**8 Drinks**			
After hours	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1
Weight pounds																
80	.17	.17	.19	.20	.19	.22	.22	.25	.25	.27	.27	.30	.29	.30	.32	.33
100	.13	.14	.16	.17	.16	.18	.19	.21	.20	.22	.23	.25	.24	.25	.27	.28
120	.09	.11	.13	.14	.13	.14	.16	.17	.15	.17	.19	.20	.19	.20	.22	.23
140	.07	.09	.10	.12	.10	.12	.13	.15	.13	.14	.16	.17	.15	.17	.18	.20
160	.06	.07	.09	.10	.08	.09	.11	.13	.10	.12	.13	.15	.13	.14	.16	.17
180	.04	.06	.07	.09	.06	.08	.09	.11	.09	.10	.12	.13	.11	.12	.14	.15
200	.03	.04	.06	.08	.05	.07	.08	.09	.07	.09	.10	.12	.09	.10	.12	.13

Numbers equal the percentage of alcohol in the blood. Dash (—) = a trace of alcohol.

Use this chart as a guide to tell you how much you can drink. The chart supposes that you've eaten, and are drinking an "average" drink. BALs for people with empty stomachs, and for those drinking more potent drinks (martinis, manhattans, "doubles," and the like) will be higher.

FOR COMFORT

A "CLASSIC" ACCIDENT

Last summer I was driving east on Highway 18 in Apple Valley, Calif., at about 40 or 45 mph. It was about 7:00 p.m. As I approached the street lights marking the intersection of the highway with Kasota Road, I had the green. I was traveling in the far right lane and I could see a white car on Kasota Road which appeared to be trying to cross the highway. About 200 feet from the intersection I checked the lights again and confirmed that I had the green light. I was confused as to why the driver of the white car seemed to be thinking of crossing. He seemed hesitant about making a decision. Just at the last moment, when I was only 25 feet away from the intersection, he decided to cross. But he did not attempt to pick up his speed in order to clear the intersection and there was no way for me to avoid hitting him.

The front end of my car, a 1978 Oldsmobile Cutlass Supreme, impacted the right rear portion of the white car which was a 1974 Chevrolet Nova. My Oldsmobile sustained major damage but the Nova received only minimum damage and was still drivable.

Consistent with my practice of always fastening my seat belts, I was buckled in at the time of the crash. Had I not been restrained I feel I would have been seriously injured. As it was, all I received was a bruise mark on my chest where the belt had done its job of holding me in place.

The driver of the Nova admitted he had been drinking. He did not have his belt fastened and he was bruised and cut from being tossed about in his car.

The final report from the Highway Patrol said that the other driver had failed to heed the red light and was inattentive to what was going on. He could not even remember the direction he was traveling and did not really know what had happened.

Thanks to the writer of this letter for sharing his experience with us. Keep those belts buckled and be ever alert to the fact that a vehicle moving in a peculiar manner may have a driver who is under the influence of alcohol or other drugs.

If you other readers have had accidents or near-misses you are willing to share, please write to me. Your local Ground Safety Office can give you a "Too Close for Comfort" form, pre-addressed to me. You need not sign your letter. The idea is to learn from each other's experience.

LELAND K. LUKENS
Brigadier General, USAF
Director of Aerospace Safety

Glossary

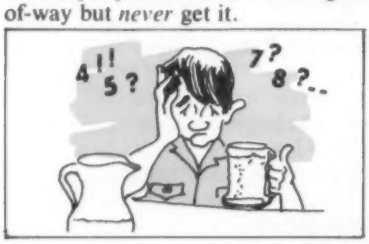
(with tongue in cheek)

In order to anticipate the wrong moves of those accident-prone drivers out there on the road with you, you need to understand their language. To this end, with tongue in cheek, we present a GLOSSARY of terms used by the high-risk folks who force *you* to drive defensively!

ACCELERATION LANE: The lane where drivers do everything *but* accelerate.

ACCIDENT: Something that always happens to the "other guy."

BICYCLE: A two-wheeled device on which people *demand* their right-of-way but *never* get it.



BLOOD-ALCOHOL CONCENTRATION: Thinking hard about how much one has already had to drink.

BRAKE FADE: Memory of how good the brakes were.

BRAKING DISTANCE: Something that is longer than a driver thinks it is.

BRAKING TIME: A couple of seconds ago.

BYPASS: Waving bye-bye while going around another vehicle.

CAR LENGTH: The pre-accident distance from the front to back bumper.

CAUSE: See Blood-Alcohol Concentration.

CENTRIFUGAL FORCE: Something that is hard to say when BAC has led to cause.

CONTRIBUTORY NEGLIGENCE: This Glossary.

CRITICAL APPROACH SPEED: The speed at which the "backseat driver" speaks up.

CURB: The Lt. Gov. of California.

DAYTIME: "The officers, *day timed* me going 62 mph."

DECELERATION LANE: The lane where people accelerate.

DEFENSIVE DRIVING: The offensive driver is trying to get some place, the defensive driver is trying to stop him.

DISCOURTESY: Gestures made toward other drivers.

DRIVER-JUDGMENT DISTANCE: The distance between the driver and traffic court.

DRIVER-JUDGMENT TIME: Ditto, but with time instead of distance.

DRIVING UNDER THE INFLUENCE: Having physical control of the vehicle when you don't.

EVASIVE ACTION: Answers to a patrol officer's questions.

FATAL ACCIDENT: Something at least one of the parties involved will never talk about.

FINANCIAL RESPONSIBILITY: With inflation, this term can't really exist.

FIXED OBJECT: A car coming out of a body shop.

FLASHING RED: An annoying light.

FLASHING YELLOW: A less annoying light.

FOLLOWING DISTANCE: Something that is hard to maintain.

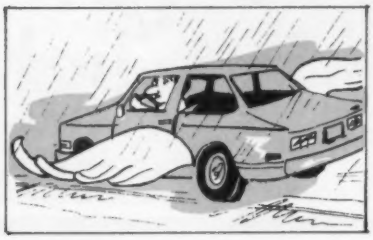
GRADE SEPARATION: Something a superior will always remind a junior about.

GRADIENT: The person who scores the driving test.

GUARDRAIL: A device for keeping high-speed drivers inbounds.

HEADWAY: The weight of the upper portion of a motorcyclist without a helmet.

HIGHWAY: Driving while toking.



HYDROPLANING: A wet flying experience.

IMPLIED CONSENT: Although the other driver has the right-of-way, she or he appears to be yielding.

INNER LANE: The one you're trapped in.

INTERCHANGE: The coins in the purse or pocket.

INTERSECTION: A place to divide and conquer.

INTERSTATE: A place with a lot of 55 mph speed limit signs.

JUNCTION: What is left of cars that have a coming together at an intersec*tion*.

LOCAL TRAFFIC: Crazy drivers.

MEDIAN: A means of contacting drivers who have passed before you.

MERGING: One of the ignored traffic signs.

MOTORCYCLE: A different spelling for bicycle.

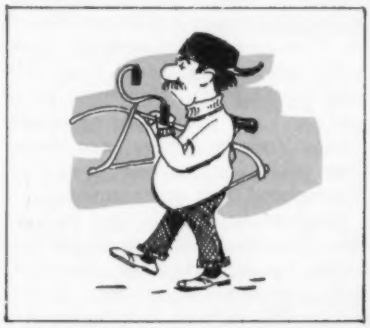
MOVING VIOLATION: See accident.

NON-PREVENTABLE: The driver's assessment of the accident.

OUTER LANE: The one you can never get to.

PARKING: Spectator sport.

PASSIVE RESTRAINTS: Your conscience.



PEDESTRIAN: A bicycle rider without wheels.

PERFECT DRIVING: Yours.

PREVENTABLE: What people always tell you their accident or ticket was.

RAMP: Something that's always missed.

REACTION DISTANCE: The distance covered between seeing trouble and realizing it's too late.

REACTION TIME: The time for above.

REVOCATION: Getting a new job.

ROADWAY: A funny spelling for "the cowboy rodeway on a hoss."

RIGHT-OF-WAY: Something that is always yours.

SAFETY-ZONE: Doesn't exist.

SECOND LANE: The one you got, but not the one you wanted.

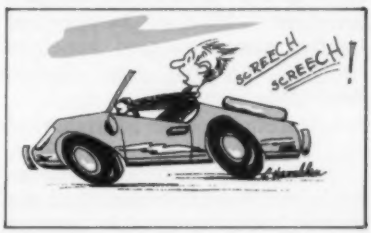
SECURED: Bacon treated with sea salt.

SHOULDER: The place you end up when you argue with a large truck.

SPEED-CHANGE LANE: The place where people are indecisive.

STANDING: Where a driver is left without gasoline.

STOP LINE: "I don't know for sure, but I think we just drove over another."



STOPPING: Something that's easier to talk about than do.

TAILGATING: The car-oriented party associated with heavy traffic periods.

THIRD LANE: The place where police ask burning questions.

THROUGH TRAFFIC: Other vehicles you no longer concern yourself with.

TOTAL STOPPING DISTANCE: A long way.

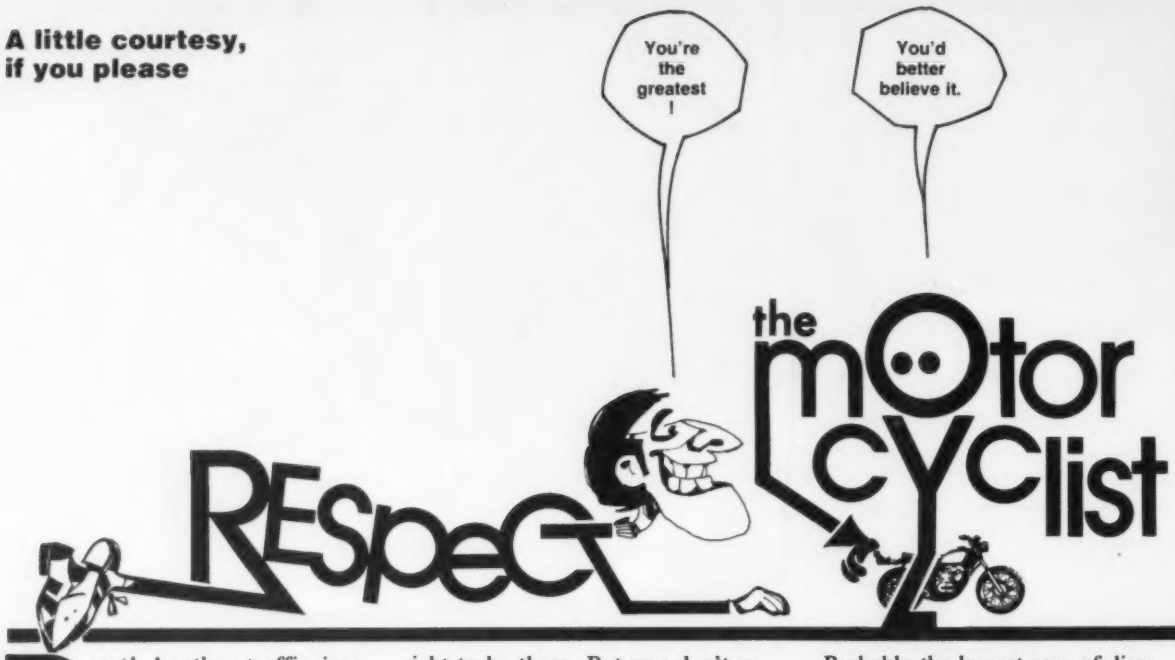
TRAFFIC: Other idiots on the road.

TWO-SECOND RULE: If you're second in line twice, you're safe.

VEHICLE ABUSE: Swearing at a vehicle when you can't see the driver.

WEAVING: Small children waving goodbye.

A little courtesy, if you please



Drat! Another traffic jam. Well, there's always a traffic jam in this area every morning. Why should today be any different? Six lanes of traffic all bumper to bumper and moving at — well it's hard to tell because the speedometer doesn't register too well below 20 mph. Who says the national speed limit is 55? It may be when you can find some open road, but there certainly isn't any "open" road in this traffic.

At least the seat is comfortable and the temperature is just right in here. Nobody's blowing their horn so the traffic noise isn't louder than the stereo. Looks like it'll be another sunny day.

Yipe! What's that? A noise and a blur. Whew, it was just a motorcycle riding between cars.

Now that's upsetting.

No, the motorcyclist isn't upsetting. Why be upset with somebody who is able to make time in traffic? More power to you, buddy.

What's upsetting is not seeing the motorcycle coming. And why didn't you see the motorcycle? Because you weren't looking for it, that's why.

It's a common everyday occurrence. It happens on the expressway. It happens at intersections. It happens when pulling out of a driveway. You just don't see the motorcycle.

They're there. They have every right to be there. But you don't remember to look for them.

Sure, they're smaller than a car. They're difficult to spot in traffic. And it is harder to judge their speed. But the real problem is you just aren't looking.

Now the motorcyclist is getting the feeling that you're out to get him or her. You looked right at them. How could you not see them? They had their headlight on. You must have seen it. They were wearing bright colors. You must have seen them. How could you not see them? But you violated their space anyway.

Motorcyclists really feel vulnerable. They're exposed to all the elements. For protection they have helmets, eye protection, boots, gloves and durable clothing. But these aren't much when compared to all that heavy metal your car or truck has.

All that's really necessary is respect. Respect motorcyclists as fellow drivers. Share the roadway with them.

If nothing else, you have to respect the motorcyclist for his or her abilities to handle the machine. For instance, the motorcyclist has to use hands to operate the throttle, clutch, front brake, turn signals, light switches and horn, in addition to maintaining balance and steering control. That's a lot, especially when some car drivers can't even manage to operate the turn signals while gripping the power steering wheel.

Probably the largest area of disrespect between vehicles is at intersections. Almost 40 percent of motorcycle accidents involving another vehicle occur at intersections. The four-wheeled vehicle was at fault in almost 70 percent of these accidents, while the four-wheeler and two-wheeler shared the blame in two percent.

The primary error: failure to yield right of way. On the four-wheel side this accounts for 89 percent of the accidents. For motorcycles it's 49 percent.

It should be clear that you should always be prepared to yield the right of way to oncoming traffic. That small gap in oncoming traffic that you were planning on turning in may contain a motorcycle. Or there may be a motorcycle planning on turning out of the oncoming traffic. Check traffic on the right. Check traffic on the left. Check oncoming traffic. Slow down and double check the traffic.

If the intersection has traffic lights, be extra careful of traffic going through on a yellow light, or the individual who wants to make that quick left turn in front of you.

And remember there are other types of intersections such as driveways, alleys, traffic circles, entrance and exit ramps.

Another major area where motorist and motorcyclist fail to show respect for one another is in the following

distance. If a motorcyclist is following you too close, provide him or her with the normal signals: flash your brake lights; slow down and allow the motorcyclist to pass (safely); or accelerate. On the other hand, if you are following a motorcycle and get these same signals, take the hint. The motorcyclist may even wave at you to back off.

If you are having trouble judging your following distance, just remember the two-second rule. Pick a fixed point ahead of the leading vehicle. The point can be a shadow, pavement marking, sign, etc. Once the lead vehicle has passed the point, count two seconds (one thousand one, one thousand two). If you pass the point before the two seconds are up, you're too close.

Passing requires a great deal of respect between motorist and motorcyclist. The important considerations are: being seen by the other vehicle operator, and having enough time and space to make the maneuver safely. Proper signals are a must. Communicating with other vehicles can prevent critical situations from developing. Whether passing or being passed, use the mirrors and look ahead to keep aware of changing traffic conditions.

Remember, even though a motorcycle is smaller than a car, the cyclist is still entitled to a full lane. If you are being passed, maintain your lane position and speed. Speeding up while being passed is improper and dangerous.

When passing a motorcyclist your windstream can create buffeting that may cause the cyclist to wobble or lose control. Again, allow the cyclist a full lane. And avoid returning to the original lane too soon — a cyclist is extremely vulnerable when forced right or off the road.

Of course, part of passing is lane-changing and that presents a problem in itself. Often your car's blind spot hides a motorcycle. Outside rear-view mirrors are not enough. When changing lanes it is a good policy to take a quick glance over your shoulder. Be alert for the presence of a motorcyclist on the outer edge of your traffic lane, especially on turns.

With the ever-increasing numbers of motorcycles on the road, you should be expecting one to appear in traffic at any time. As a rule, motorcyclists ride in the left third (left wheel track) of a lane. This position enables them to have a better view of traffic and the road as well as making them more visible to you.

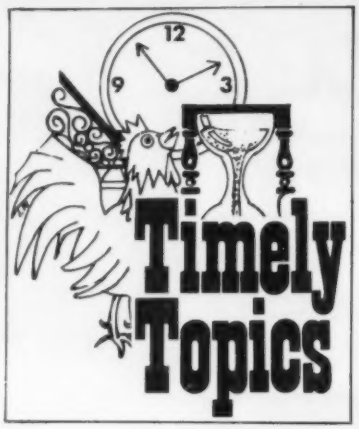
Another area that falls into the realm of disrespect comes when misinterpreting a cycle rider's intentions. Noting the motorcyclist's lane position is a key to the rider's next maneuver. But remember that motorcycle turn signals are not self-canceling like those on cars, so they may remain on even after a maneuver has been completed.

Perhaps one of the most misunderstood areas between motorcyclists and non-riders is road hazards. Minor problems for four-wheeled vehicles such as potholes and railroad tracks can be major hazards for two-wheeled vehicles. Potholes, railroad tracks, oil slicks, gravel and sand, puddles, road debris, ruts and other hazards may require sudden lane position changes as well as directional changes for a motorcyclist.

Sand, mud and water make starting and stopping a motorcycle more difficult. Loose gravel and other quick-spill materials force the cyclist to ride with extreme caution. Even wet paint stripes can alter the direction and speed of a motorcycle.

The four-wheeled driver must be aware of how the motorcyclist "sets up" when encountering such hazards, expecting the rider to make sudden changes in position and direction. For example, when crossing railroad tracks, the motorcyclist will adjust the cycle's position to cross the tracks at close to a 90-degree angle. This is done to prevent a sudden loss of traction and control.

An attitude that is respectful of all other drivers including motorcyclists can be a significant factor in driving safety for everybody. Cooperation in traffic is essential. By operating your vehicle according to the laws, with courtesy and common sense, we can *all* live on the roads together.



WHEN WILL WE LEARN?

Only seven percent of Americans use seat belts. In Sweden, where usage is mandatory, 85 percent buckle up. The result: Driver deaths dropped almost 50 percent, while passenger deaths dropped 67 percent. That's from a study released by the American Seat Belt Council, which details seat-belt usage in 21 of the 29 countries with mandatory-use laws. ASBC feels that the key to getting more people to buckle up is strict enforcement of mandatory seat-belt-use laws. The dollar saving of seat-belt use can be impressive, also, running into the tens of millions of dollars in health, damage, and other costs related to accidents.

(Popular Science)

LIFETIME WARRANTY

Ford Motor has started its third field test of a service program which, if successful, could have a major impact on the automotive repair industry. The program guarantees repair jobs performed on Ford Motor products at Ford and Lincoln-Mercury dealerships for the life of the vehicle. Labor costs are included, in addition to parts. Not included are normal maintenance items such as spark plugs, brake linings, filters, wiper blades. Dealers involved are enthused with results. The tests have been underway since June in Chattanooga and Kansas City, Mo., and were expanded to Macon, Ga., last week.

(Automotive Information Council)

WHAT'S IN A NAME?

Auto executives claim that more time, effort, and emotion are spent in researching a car's name than just about any other recurring business practice. In the end, though, the name may not really count heavily with the public. "The car makes the name" is the way the phenomenon is explained. However, name-selecting programs do continue, and once a name is picked, companies will go to great lengths to get it on the street. Years ago, Olds purchased the Omega name (for a reported $40,000) from a small importer who brought a few Omega sports cars into this country shortly before the Olds compact was introduced. And Pontiac still pays the Sports Car Club of America $5 per car for each Firebird Trans Am it produces — just for the use of the Trans Am name.

(Popular Science)

FACIAL PAIN IN MOTORCYCLISTS

With the onset of cooler weather, dentists around the country — especially in colder climates — usually have an influx of young adult patients complaining of severe facial pain. A little research will find that many of these patients are motorcyclists who had recently ridden their cycles without any face protection from the wind. This can drop the effective temperature by many degrees by a combination of cold and increased wind against the face.

The pain usually involves both sides of the face and sets in about two hours after the motorcycle ride. It will be a constant rather than intermittent pain. It will be located in the tooth area of the face which is why these patients usually make a beeline to the dentist.

The cause has nothing to do with the teeth but rather the sensitivity of the branches of the trigeminal nerve. The pain will be severe enough for many patients to ask to have some teeth extracted. However, since prevention is better than therapy — we suggest motorcyclists wear face protection during cold weather.

FORD TO GO PUBLIC WITH RECALLS

Following a storm of controversy over its recall policy, Ford Motor Company has agreed to publicly announce all future safety recalls in order to avoid any "misunderstandings." Company Chairman Phillip Caldwell said Ford now will announce its recalls at the same time it notifies affected owners. Both Ford and Chrysler Corporation came under heavy fire recently when it was learned that neither company had announced a total of nine recalls involving 222,538 1981 vehicles.

(AutoWeek)

K-CAR RECALL

Chrysler has announced a recall involving about 10 percent of 110,000 Reliant and Aries models built between March and June of 1981. The recall is to replace a faulty stoplight switch that prevents the stoplights from functioning when the brake pedal is depressed. Chrysler says no accidents have yet been reported attributable to the faulty switch.

TIRE-WARNING PROPOSAL THROWN OUT

The National Highway Traffic Safety Administration (NHTSA) has terminated all rulemaking procedures that would have established a safety standard for low-pressure warning devices for tires.

The agency issued an advance notice of proper rulemaking last January, asking for comments on the feasibility of the proposed standard. Had it gone into effect, the standard would have required all motor vehicles to be equipped with devices to warn drivers of dangerously low tire pressure.

The comments received by NHTSA indicated that two kinds of warning devices were feasible — in-vehicle and on-tire.

In-vehicle warning devices monitor each tire and relay information to a mechanism on or under the instrument panel. These devices are accurate and reliable, but would add about $200 to the retail price of each passenger car, according to comments filed with NHTSA.

Though the benefits offered by such devices might be substantial, the comments noted, the costs currently outweigh them.

As for on-tire devices, the cost is minimal — about $5 — but they are far less accurate and reliable than in-vehicle devices, and they can be damaged by ice, mud, curb scuffing and other road hazards.

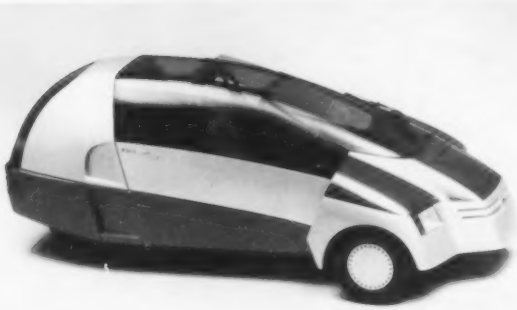
(Automotive News)

FORD RECALLS MUSTANGS, CAPRIS

Ford Motor Co. is recalling about 6,700 1981 Mustangs and Capris for repair of front-seat mechanisms which could cause the seats to recline unexpectedly. Ford, which is also repairing defective headlight dimmers on about 600 1982 Lincoln Town Cars and Continental Mark VIs, said it knew of no injuries resulting from the faulty recliners.

(AutoWeek)

futurecars?



1985
1986
1987
1988
1989
1990
1991
1992

In the late 1980s and the 1990s you may drive something like the vehicles pictured here. These are two of Ford's concept cars, experimental designs the company has been displaying as examples of future cars.

The Probe I is an aerodynamic design with a wind drag coefficient of .25. The average U.S. car of today has a coefficient of about .45. Ford estimates that improvements in aerodynamics have accounted for at least one mile per gallon of their gains in Corporate Average Fuel Economy since 1978. Ford projects 39 mpg on the highway for the Probe.

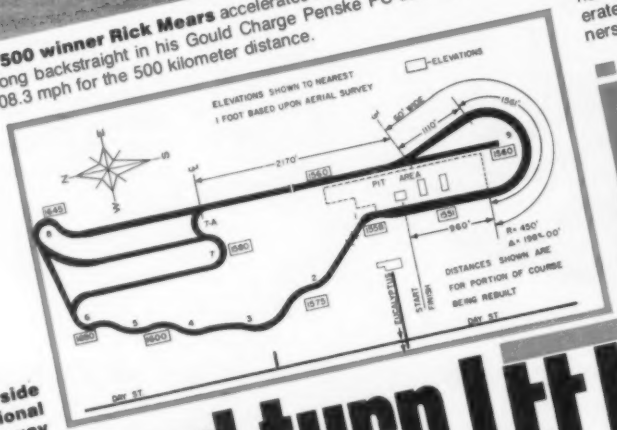
The other concept car here is the Cockpit, so named because it reminded someone of the cockpit of a plane. The Cockpit is a three-wheeled vehicle Ford envisions as a commuter vehicle. They claim 75 mpg for in-city driving for the Cockpit. It is 10 feet long, 4½ feet wide and four feet high, and it weighs only 770 pounds. The car is powered by a 12-horsepower 200 cc, one-cylinder engine mounted inside the rear wheel.

Remember — these are only experimental. Don't look for anything like them on your dealer's showroom floor for a while.

"go down this freeway at 200mph

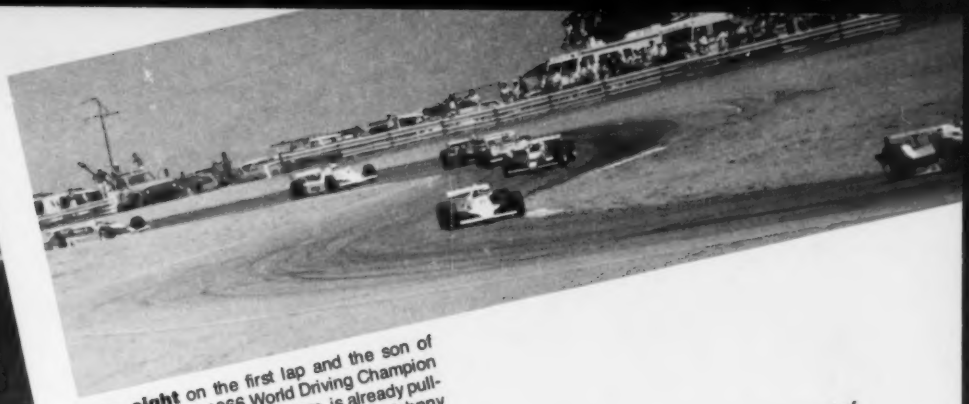
California 500 winner Rick Mears accelerates to nearly 200 mph on Riverside's mile-long backstraight in his Gould Charge Penske PC-9B Cosworth. He averaged 108.3 mph for the 500 kilometer distance.

Runner-up Gordon Johncock hangs it all out in Riverside's banked turn nine. He was never able to make up for ground lost by not having first gear to pull out of the pits or accelerate away from the track's three slowest corners.


ELEVATIONS SHOWN TO NEAREST 1 FOOT BASED UPON AERIAL SURVEY
ELEVATIONS
PIT AREA
DISTANCES SHOWN ARE FOR PORTION OF COURSE BEING REDUILT
START FINISH
DRY ST

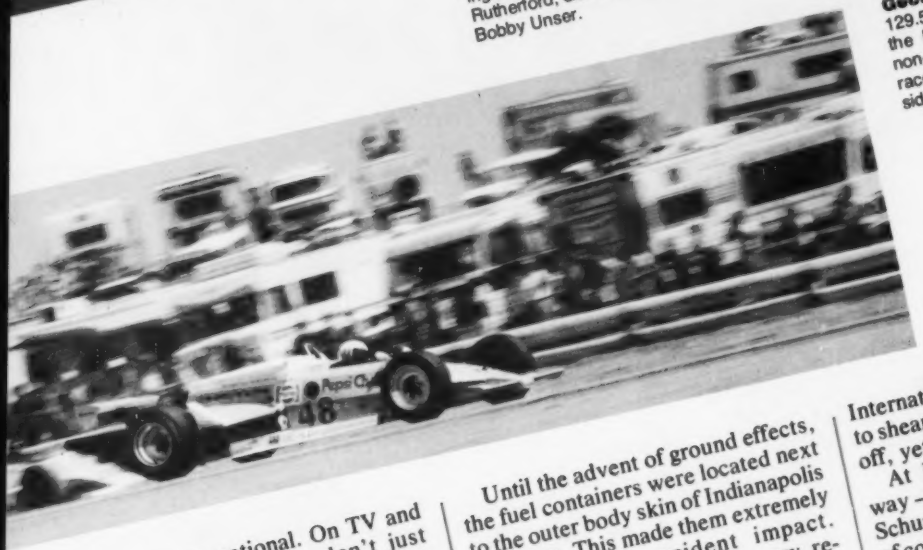
Riverside International Raceway

and turn Left into a dark alley"



Turn eight on the first lap and the son of 1959, 1960 and 1966 World Driving Champion Jack Brabham, Geoff Brabham, is already pulling out a lead on Al Unser, Rick Mears, Johnny Rutherford, Gordon Johncock, Tom Sneva and Bobby Unser.

Geoff Brabham set a new course record of 129.559 mph to win the pole starting position in the Pepsi Challenger Eagle. Powered by a non-turbocharged Chevy V-8 the Eagle led the race by as much as 15 seconds before being sidelined by handling problems.



Fires are sensational. On TV and in the movies cars don't just crash; they crash and burn. But that's drama, not real life. In reality less than one-half of one percent of all auto accidents involve fire. That's less than one accident in 200.

Such has not always been the case with the type of cars raced at Indianapolis. There was a time when fire was a part of any severe accident with these type vehicles. But now technology has reduced the problem.

Perhaps the biggest lifesaver in Indianapolis car racing next to the seat belt has been the fuel cell. This is a flexible bladder filled with blocks of porous foam. The bladder is crushproof, leakproof and, because of the foam, explosion-proof. It is possible, however, to cut or puncture cells with sharp objects, so they are placed in metal containers.

Until the advent of ground effects, the fuel containers were located next to the outer body skin of Indianapolis race cars. This made them extremely vulnerable to accident impact. Ground effects, however, now require using most of the area within the sidepods to create the desired air flows that hold the car more firmly to the pavement. Therefore the fuel tanks have been relocated inboard with the ground effects sidepods providing deformable fiberglass or carbon filament structures to absorb impacts.

As many people saw on national TV, Danny Ongais had a tremendous impact with the third turn wall at Indianapolis. Although the car literally disintegrated and it took 15 minutes to cut Ongais out of the car, there was only a small oil fire. Not a single drop of fuel spilled from the tanks even though he had refueled the car to its full 40-gallon capacity less than two miles before the accident.

Again on national TV, A. J. Foyt hit the turn-two fence at Michigan International Speedway hard enough to shear the entire right side of his car off, yet no fuel was spilled.

At Riverside International Raceway — on national cable TV — Vern Schuppan contacted a 12-foot section of concrete wall hard enough to tear it loose from other sections of the wall to which it was anchored with steel cables and move it back 10 feet. Schuppan's car flipped upside down and was destroyed. However, when they got him out from under the car he had only a small cut on his elbow. Again, no fuel was spilled.

continued

continued

Johnny Rutherford brakes for turn eight between the two and one hundred yard markers. On the next lap Rutherford reported: "I tried to pull up beside him (Jerry Karl) in six and again in seven, but he didn't move over to let me by. Then I got alongside of him (at turn eight) and it was as if he turned right into me." Rutherford spun out of the race, while Karl's car went over the embankment and into the guardrail. One of the tires that was torn off hit one of the parked campers. Karl ended up with a bruised left leg, while Rutherford was uninjured.

In a car similar to Tom Sneva's March-Cosworth pictured here, Vern Schuppan moved the turn-one concrete wall back 10 feet when something in the steering broke.

Why aren't fuel cells put in passenger cars? First of all because they are very expensive. Secondly, with fires involved in less than one accident in 200 there's no great need, statistically speaking.

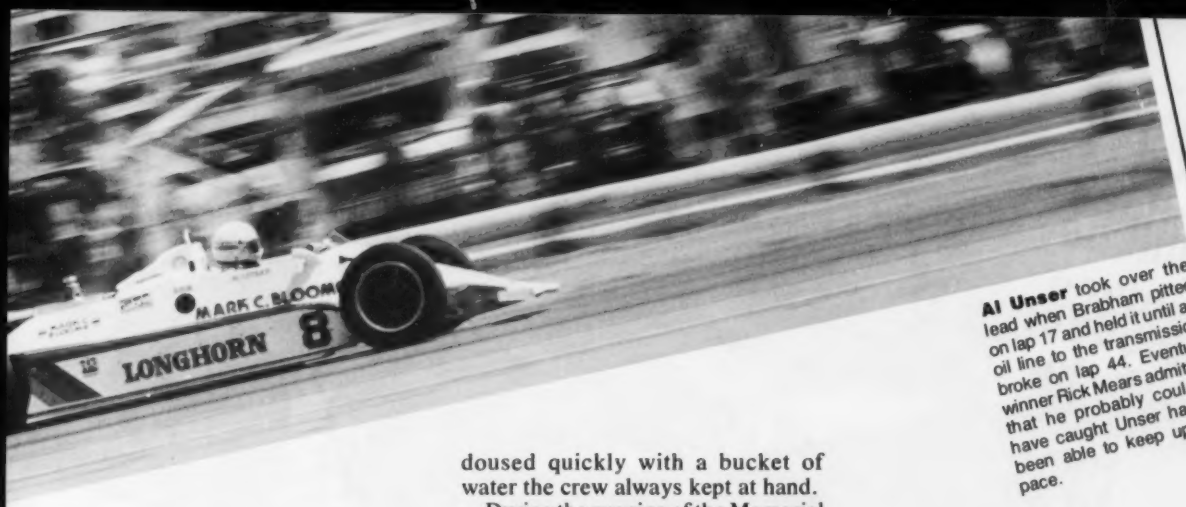
If a fire should break out in a race car, the drivers have still done everything they can to protect themselves. To begin with, they always fasten their seat belts — all four of them. That's right, four seat belts: one across the hips, one over each shoulder and two crotch belts to prevent submarining under the one across the hips.

Why do they attach themselves to what amounts to a 40-gallon fuel tank? Because they know their chances of getting out of the fire increase 10-fold if they survive the impacts, and the best way to do that is buckle up.

That still means that the drivers have to endure the fire from the point of combustion until getting clear. For this they wear fireproof clothing. First, they put on full-length Nomex underwear and socks. Over the underwear they have up to a three-layer, quilted Nomex suit. They also wear gauntlet-style Nomex gloves and boots. While their helmets provide fire-resistance, there are openings around the neck and face. To protect these openings the drivers also wear Nomex hoods with chest protectors that tuck inside the outer body suit. In addition, the face shields on the helmets are usually Lexan.

This all provides protection against direct flames burning through to the body as well as thermal insulation from the 2,500 degree Fahrenheit heat for at least 60 seconds. Much longer than that and the drivers are likely to be fatally injured from breathing superheated air or flames.

Indianapolis car drivers are special people. They have to be. After all, it



Al Unser took over the lead when Brabham pitted on lap 17 and held it until an oil line to the transmission broke on lap 44. Eventual winner Rick Mears admitted that he probably couldn't have caught Unser had Al been able to keep up the pace.

takes special people to strap themselves into one end of a 1,500-pound aluminum tub with a 600- to 700-horsepower turbocharged V-8 engine in the other end. They have to be special to drive down what amounts to a freeway at more than 200 mph and, as one driver put it, "turn left into a dark alley."

They are people who have better stamina, reflexes, coordination, eyesight and general health than the average person. Sometimes they are even more intelligent. They do have excellent powers of concentration, perception and judgment. They might make good military pilots except that they have low group needs as well as being very independent and stubborn. They are self-motivated, self-directed and self-disciplined.

Drivers generally assume a great deal of personal responsibility for what they do. This makes pit stops, when the car is motionless and in the hands of the five people servicing it, especially trying for the drivers. This year pit stops have become even more trying for the drivers because that's where all the fires have happened.

Indianapolis car fires are even more diffcult to fight than most because the methanol fuel burns with a colorless flame. On the plus side, there is also no smoke to hamper the fire-fighting efforts until things such as tires start burning.

The first pit fire occurred during carburetion tests three days before the Indianapolis 500. A fuel leak caused a fire to break out while Johnny Rutherford sat in his car. It was doused quickly with a bucket of water the crew always kept at hand.

During the running of the Memorial Day classic which was delay-televised that same evening, a fire broke out in the Rick Mears pit. Six crew members were burned and Mears had to bail out of his burning machine, grab an extinguisher away from a fireman and put out his flaming uniform. At the same time, a crewman from Rutherford's pit ran about 100 yards with his team's bucket of water to douse Mears.

That bucket of water has now become mandatory for every Championship Auto Racing Teams (CART) PPG Indy Car World Series competitor. In addition, special fire-resistant apparel similar to what the drivers wear is mandatory for pit crews.

But this year's pit fires didn't stop at Indy. During the next event at the Wisconsin State Fairgrounds in Milwaukee, Herm Johnson's car caught fire during a fuel stop. The CART safety crew acted quickly as national cable TV cameras fed the scene live to their viewers.

At the following race, the Norton Michigan 500, things didn't work out as well. Before a live national network TV audience, Johnson's car again caught fire. As Johnson and a crewman, both ablaze, ran to the firemen, the colorless methanol flame spread to the two adjacent pits. In seconds wheels, tires, and other pit equipment were burning. Three Michigan International Speedway firemen with asbestos suits walked into the center of the fire and put it out before being overcome by smoke. In all, 14 people were treated for burns and other minor injuries, while the race was delayed 97 minutes to clean up the area and replenish the fire bottles.

The next race to be run was the *Los Angeles Times* California 500 at Riverside, again before a live cable TV national audience. Here fuel from an overflow vent bottle was dumped onto driver Dick Ferguson. Ferguson was hit with the water bucket before a fire could start, but not before he suffered some skin irritations from the methanol.

The rash of pit fires has been partly blamed on the ground effects designs. The relocated fuel tanks are located in such a position that spilled alcohol fuel can now drip onto hot parts and ignite. Most crews still feel safer about the relocated fuel tanks because they can't be punctured when a car hits the wall.

"Fire is bad," said ex-driver turned designer-builder Jim Hall, "but if the choice is having a fire out on the course or having one in the pits, at least in the pits there are a lot of firemen with plenty of equipment right there, and they don't have to go a long distance to attack the fire as they do out on the course."

As for actually fighting the fires, water seems to be more effective against alcohol fires than the chemical retardant known as Purple K. The Purple K does a good job of knocking down the fire, but it doesn't make the alcohol go away. Water douses the fire as well as cooling and diluting it.

Regardless of all that has happened this year, however, the Indy car drivers still agree that their best firstline defense against fire is seat belts.

continued

"forty gallons, please; check the tires and watch out for FIRE"

1

2

3

4

5

6

7

8

Roger Penske's pit crews (he has three race car teams) are among the best in Indy car racing. Here the Gould Charge crew prepares to service race winner Rick Mears six laps from the end of the California 500. First they suit up and make sure they have everything they might need ready **(1).** Then, as Mears approaches the pit entrance they wave to get his attention **(2).** As he brakes they place a flexible sign exactly where the nose of the car is to stop **(3).** As the car stops they move into place: fueler and vent overflow bottle holder on the right; tire checker and water pourer on the left; and air wrench operator from behind **(4).** As the fuel rushes in, the water bucket holder stands ready in case any alcohol spills **(5).** With the fuel still flowing the tire man backs around to join the wrench operator behind the car's wing **(6).** Then with the tank full, the vent bottle holder backs away from the car as the fueler tosses the hose to another crewmember behind the pit wall **(7).** And they push Mears back into the race **(8).**

continued

FIRE FIGHT

Riverside emergency crews took special lessons in fire fighting before the California 500 and got extra practice in the stock car race that preceded the Indy car event. St James Davis lost control of his 1980 Dodge at the end of the backstraight **(1)** and smacked the retaining wall **(2).** If you look directly behind the car's trunk on the top of the wall you can see the safety worker already grabbing the fire extinguisher. The car then continued to spin off the wall **(3)** and down the banked turn, spreading a small oil fire behind it **(4).** Before the car stopped moving, the emergency crew worker, wearing Nomex underwear and hood as well as safety goggles, already has the Purple K extinguisher in action **(5).** When the car stopped, the driver bailed out the left side window as the emergency worker vanished in the smoke to put the fire out at the source **(6).**

1

2

3

4

5

6

tteecc!h!h double tech with tsgt ron lathrop

COMMENT: Which units in the emission system often become defective and cause rough idling?

REPLY: Your question is vague in a very pointed way. Almost every function of an engine contributes to the emissions of the vehicle, from basic timing to the thermostat. What I check when encountering rough idling, in the order that I check, is:

- Curb idle speed
- Fast idle speed
- Timing
- Idle mixture
- Feedback system operation
- Spark plug gap
- Ignition component moisture
- Broken or loose ignition wires
- Damaged distributor cap or rotor
- Fast idle cam adjustment
- EGR Valve operation
- PCV Valve air flow
- Choke setting (and possible binding)
- Vacuum leaks
- Float bowl level
- Air bleed and idle passages for clogs
- Air cleaner (clogged?)
- Choke vacuum diaphragm
- Exhaust manifold heat valve
- Distributor spark advance
- Valve leaks
- Damaged valve components
- Carburetor mounting
- Distributor shaft play
- Wiring connections

COMMENT: Can a vacuum gauge be used to time a diesel engine and fuel injection-type engine the same as a standard auto engine? Would you get 20 inches of vacuum at idle also on these engines?

REPLY: Why not?

COMMENT: Do graphite-type engine oils that reduce friction cake or clog in the engine? Are they really worth the money?

REPLY: If they did I seriously doubt that they would have passed any of the specifications listed on the labels. What they are really worth is a question each individual has to answer for himself. For people like me, who change their oil and filter at half the manufacturers' recommended intervals, probably not. But at the same time, I do use a super premium oil with a special additive that costs more than most oils, simply because I've always gotten good service from it and I enjoy the peace of mind it brings me.

COMMENT: I was reading that on the modern cars with a lot of anti-pollution units the spark can really be advanced farther to get better gas mileage. Is this true?

REPLY: Maybe. Most timing checks are only as good as the method used to put the timing marks on. I would not want to go more than two degrees one way or the other from what is in the specifications. Advancing the spark can lead to burned valves and overheating.

COMMENT: I had a steering wheel vibration similar to the one reported in the July 1981 Double Tech at 50 to 55 mph which increased as I braked from 55 to 30. When I took my vehicle to a front-end specialist he indicated that the disk brake rotors were warped and that this is a problem common to front-wheel-drive, disk-brake cars because of inadequate cooling. He ground the rotors and the problem disappeared. Just as you stated, he said he couldn't adjust my caster which was slightly off.

REPLY: Any time you run into a vibration during braking you have to suspect excessive lateral runout or parallelism problems first.

COMMENT: If somebody runs into vibration problems like they did in your July 1981 column I strongly suggest checking the rear wheels. I had the same problem until I discovered mud and dirt was caking inside the rim of my rear wheels, causing an out-of-balance condition.

REPLY: I recommended "Extra careful, high-speed spin balancing of *each* tire/wheel combination is a must."

To me *each* tire/wheel combination means *all* of them, not just the fronts. Balancing all the tires and wheels covers what you've recommended.

COMMENT: I have noticed that the small cars, including foreign makes which have stick-shifts, have an emergency brake which is located in the center console behind the stick. Is it there for a purpose of constant use or just for easy access? I would think it isn't all that necessary to apply the emergency brake when parking the car every time as I see some drivers do. If you were only stopping for a short period of time, wouldn't it be practical to leave the car parked in low gear like the older cars with stick-shift, and the car wouldn't be able to move anyway?

REPLY: You've got to be kidding! In most places it is illegal not to apply your emergency brake when leaving a

car parked. The brake handle is commonly located in the middle because in small cars that's the only place there is room for it. It is also located there for ease of manufacturing cars that are either left-hand or right-hand drive. Your suggestion to leave a parked car in gear only is dangerous. All it needs to start then is a little motion and a spark to the fuel supply, which can be provided by super-heated cylinders (dieseling). Besides, if the car was parked pointed downhill, you'd use reverse and the emergency brake instead of first and the emergency brake.

COMMENT: I have found that I get better mileage with an automatic transmission than with a manual. Don't most people?

REPLY: Judging from the EPA mileage stickers required on all cars, no. However, there are many people who have never mastered using a manual transmission with the smoothness and grace that are required to get the most out of the vehicle. I'd suggest that, if you can't get as good if not better gas mileage out of a manual transmission as you do with an automatic, your manual transmission driving habits need very serious review.

COMMENT: I have to disagree with your answer to the "Gas and Speed" letter in the July 1981 DRIVER Backfire. I removed the catalytic converter and also switched to leaded gas. My highway mileage increased from 33 to 36 mph along with increased pep. Perhaps it is the increased power of having it removed along with the extra two octane points received from switching to leaded gas (89 as compared to 87 for unleaded) that causes people to "put their foot in it" a little more, thus decreasing mileage. There is no way that having a catalytic converter removed reduces mileage. The converter acts just like a restrictive muffler in increasing backpressure in the exhaust, thereby reducing performance. While I certainly do not advocate the removal of the converter for use in the U.S., it should be pointed out that the expected functional life of a converter is 50,000 miles. Since my car had already surpassed this limit, I removed it because I saw no purpose in leaving a useless device attached to my car that only ruined performance.

REPLY: You've confused life expectancy with warranty. All manufacturers are required by the Environmental Protection Agency to warranty the entire emissions control system for 50,000 miles. This means that parts such as the catalytic converter must function for at least 50,000 miles. Just because a vehicle has gone more than 50,000 miles doesn't mean the converter has stopped functioning. It only means that the manufacturer is no longer liable for the cost of replacement. Catalytic converters are designed to last the life of the car. Unless a complete exhaust analysis has been done it is almost impossible to say the converter is "a useless device."

As for the converter being "a restrictive muffler," you are only partially correct. It is muffler-shaped. Inside there are no baffles or porous plates to cause restrictions. There is either a coated, one-piece, honeycombed block or small beads coated with catalyst. There are two types of converters. In the oxidation converter the materials are coated with platinium and palladium to reduce hydrocarbons (HC) and carbon monoxide (CO) emissions. In the three-way converters the coatings are platinum, palladium and rhodium to reduce HC, CO and oxides of nitrogen (NOx).

The problem with using leaded fuels in catalytic converter vehicles is that the tetra ethyl lead coats the palladium, platinum and rhodium, rendering them inoperative.

The restrictions of a converter are almost nil and certainly much less than those of a muffler. How restrictive is a muffler? In recent tests, a muffler-equipped racing machine lost all of 300 rpm by the end of a mile-long straight because of the muffler. At the rpm that racing engine was turning, that was less than three percent. That may make a difference in racing, but you would never notice it in a street car.

Besides, in a street car you need a certain amount of backpressure. In a racing engine the exhaust gases have to be pulled and pushed out of the combustion chamber so that the fuel-air mixture can completely fill the chamber for the next power stroke. So there is little backpressure combined with a lot of valve overlap. The overlap helps the incoming gas-air push the burned mixture out — and a lot of the gas-air goes out with it . . . but what the heck, a racer is looking for horsepower not mileage. On the other hand, with a street car there is little or no valve overlap. So by creating backpressure on the exhaust side, the dynamics of the fuel flow in the chamber help get as much burned mixture out while maximizing the combustion charge. Alter the designed backpressure and you can have gasoline literally running out the exhaust pipe.

As the letter you are referring to is from Germany, it is really hard to say how many points the writer gained (or lost) on the octane scale by switching to regular. But gaining octane points doesn't automatically increase the pep of any engine. In order to gain performance, you have to tune for it.

In your case, the deposits inside your cylinders may have called for adjusting the tune and increasing the octane. But with today's super-unleaded (91 octane) fuels this can be done without removing converters and running regular.

What's the savings of running regular? It could end up costing if you consider that you should change your oil and filter twice as often as with unleaded. Your spark plugs will last only half as long and your entire exhaust system is going to "rust out" in half the time.

Qs and As

EDITOR'S NOTE: If you have a general interest automotive comment or question that you would like a reply to, and feel others could use the knowledge also, send it to:

DOUBLE TECH
HQ AFISC/SEDD
Norton AFB, CA 92409

Be sure to include all available information which may help in finding the correct solution.

Coming next month:

- Dwell/RPM meter and vacuum gauge timing;
- Motorcycle vs car headlights; and
- Tire dynamics

WHAT'S that NOISE?

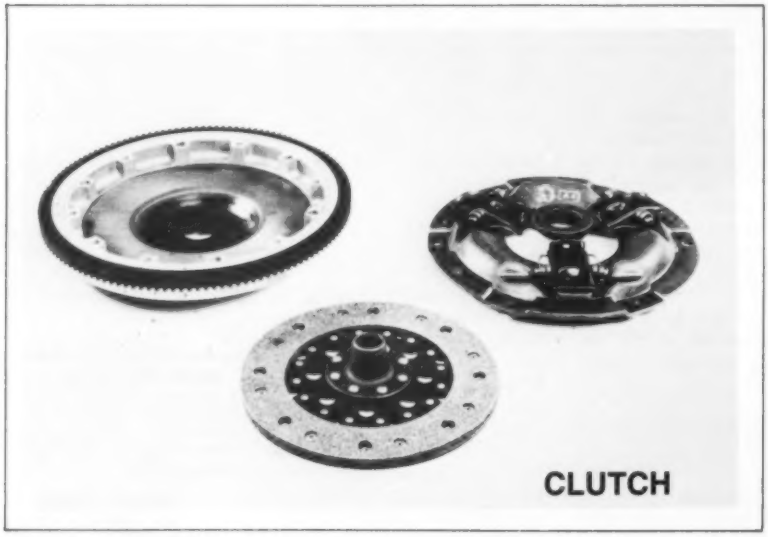
Part Two

The unusual noises your car makes can be distracting enough to take your mind off the job at hand — safe driving. When your mind wanders while you're driving you can have a near miss, minor accident or major accident.

These noises are also signals that something is wrong with your vehicle and needs repair.

Knowing exactly what causes these noises is a challenge for every motorist and backyard mechanic.

In the October 1981 DRIVER we listened to some general engine noises and discussed what could be causing each. In this article, we'll listen to the noises that clutches, manual transmissions, automatic transmissions and axles make.



CLUTCH

Chattering (or grabbing)

- Lever adjustment incorrect
- Oil or grease leaking on facings
- "U" joint flange loose
- Input shaft spline worn
- Pressure plate binding
- Release lever binding
- Disk hub binding
- Facings glazed (Be sure to check pressure plate and flywheel for scoring before replacing glazed disk.)
- Pressure plate contact unequal, check:
  - Release lever clearance
  - Disk thickness
  - Pressure plate with flywheel parallelism
- Clutch disk bent
- Spring pressure uneven
- Transmission to clutch housing alignment incorrect
- Facings loose
- Pressure plate warped (replace if more than .015-inch)
- Pressure plate worn*
- Clutch Disk worn*
- Flywheel worn*
- Clutch disk hub sticking on shaft because of excessive wear, burrs or distortion
- Release levers worn or binding (be sure to replace the release bearing, too)
- Pressure springs broken or weak
- Clutch pedal sticking because of wear or misaligned components
- Disk facing incorrect
- Engine loose in chassis because of loose or broken motor mounts.

Replace if wear is excessive or if there are signs of heat checking or scoring.

Rattling

- Release lever spring weak or broken
- Pressure plate damaged
- Clutch return spring broken
- Clutch disk hub splines worn
- Transmission input shaft worn
- Clutch release bearings worn (Also check release lever tips for wear)
- Pilot bushing dry or worn
- Release lever contact unequal
- Pedal free play incorrect
- Clutch disk warped (check pressure plate for wear, also)

Squeaking

- Release bearing dry or worn
- Pilot bushing dry or worn
- Pilot bearing turning in crankshaft
- Input shaft bearing worn
- Transmission to clutch housing alignment incorrect
- No lubrication between clutch fork and pivot
- No lubrication in torque shaft

Grinding

- Release bearing dry
- Pilot bearing dry or worn
- Input shaft bearing worn

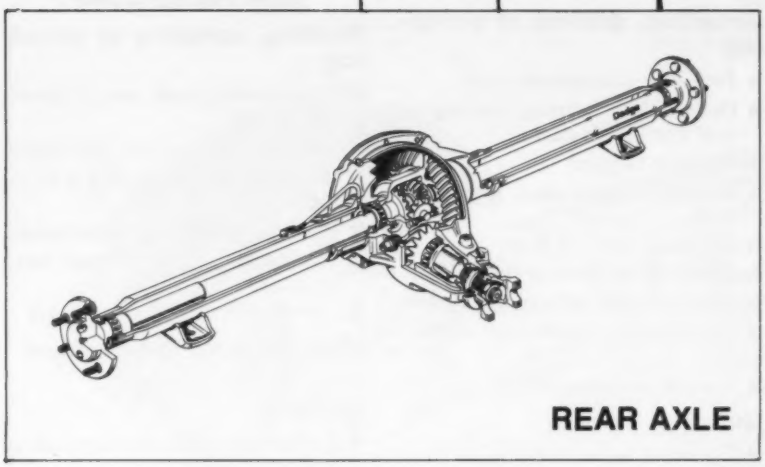
Whirring

- Pedal free play incorrect
- Transmission to clutch housing alignment incorrect

AXLES

Knocking or clunking

- Differential side gear clearance excessive



REAR AXLE

- Rear axle pinion shaft worn
- Case worn
- Differential cross shaft worn
- Axle shafts-to-differential cross shaft end play excessive
- Gear teeth mutilated
- Axle shaft spline fit improper
- Axle backlash too great

Clunking during initial engagement

- Differential side gear clearance excessive
- Ring and pinion backlash excessive
- Pinion shaft worn or loose
- Inboard joint worn or damaged

Gear howl or whine

- Pinion depth improper
- Ring gear backlash adjustment improper
- Ring gear runout improper
- Bearing preload improper

Clicking or chatter on turns

- Differential lubricant wrong
- Clutch plates worn
- Outboard joints worn or damaged
- Differential side gears worn
- Pinion worn

Knock or click every other revolution

- Rear wheel bearing Brinelled (hardened)

Grunt noise on stops

- Propeller shaft slip yoke dry

Groan in forward or reverse

- Differential lubricant wrong

Knock in drive line in high gear at 10 mph

- Universal joints worn or damaged
- Side gear hub counterbore in differential worn oversize

Ping, snap or click in drive line

- Upper or lower control arm bushing bolts loose
- Companion flange loose

Scraping noise

- Slinger rubbing on rear axle carrier
- End yoke rubbing on rear axle carrier

Body boom

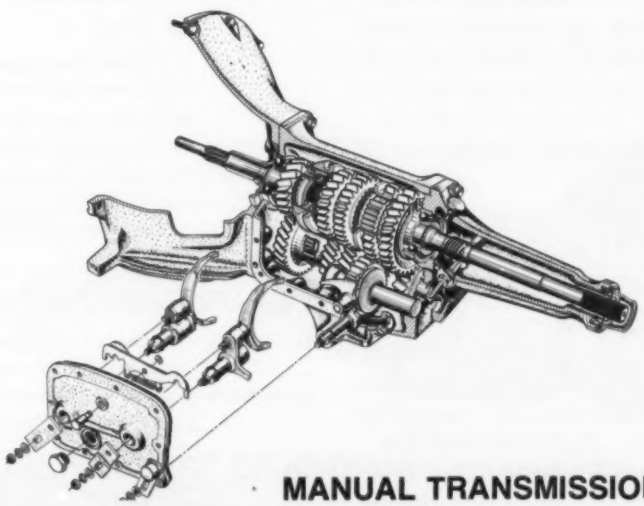
- Rear wheel bearings rough
- Propeller shaft unbalanced or damaged
- Tires unbalanced or damaged
- Universal joints worn or damaged
- U bolt torque excessive
- Drive shaft bent or damaged
- Drive shaft has undercoat on it
- Universal joints tight
- Companion flange has burrs or gouges
- Companion shaft runout too great
- Drive shaft runout too great
- Drive shaft unbalanced
- Companion flange unbalanced
- Slip yoke spline excessively loose
- Propeller shaft mis-indexed at companion flange

MANUAL TRANSMISSION

Forward gears

- Lubricant level low
- Lubricant improper type
- Body or chassis components grounding on transmission
- Transmission or clutch housing bolts loose
- Power take-off components misaligned

continued



MANUAL TRANSMISSION

continued

- Clutch housing misaligned with crankshaft
- Input, output or countershaft bearings dry or worn
- Speedometer gear or teeth worn
- (General Motors only) Teeth on countershaft gear anti-lash plate worn

Gears clash when shifting from forward gear to another

- Engine idle speed too high
- Clutch pedal free-travel out of adjustment
- Shift linkage out of adjustment or damaged
- Pilot bushing or bearing binding on input shaft or damaged
- Gears damaged
- Synchronizers damaged

AUTOMATIC TRANSMISSIONS AMERICAN MOTORS

Growling, grating or scraping

- Park lock components worn
- Output shaft bearing, bushing or seal worn or damaged
- Oil filter clogged
- Converter drive plate broken or loose
- Oil pump worn or faulty
- Front clutch worn or faulty
- Planetary gear set seized or broken
- Overrunning clutch worn or broken
- Torque converter faulty

Buzzing

- Governor worn or faulty
- Output shaft bearing, bushing or seal worn or damaged
- Valve body malfunction or leakage
- Oil pump worn or faulty
- Torque converter faulty

CHRYSLER CORP.

Grating, scraping or growling

- Low-reverse band out of adjustment
- Kickdown band out of adjustment
- Output shaft bearing and/or bushing worn
- Planetary gear set broken or seized
- Overrunning clutch broken, worn or seized
- (A-404, Horizon & Omni only)

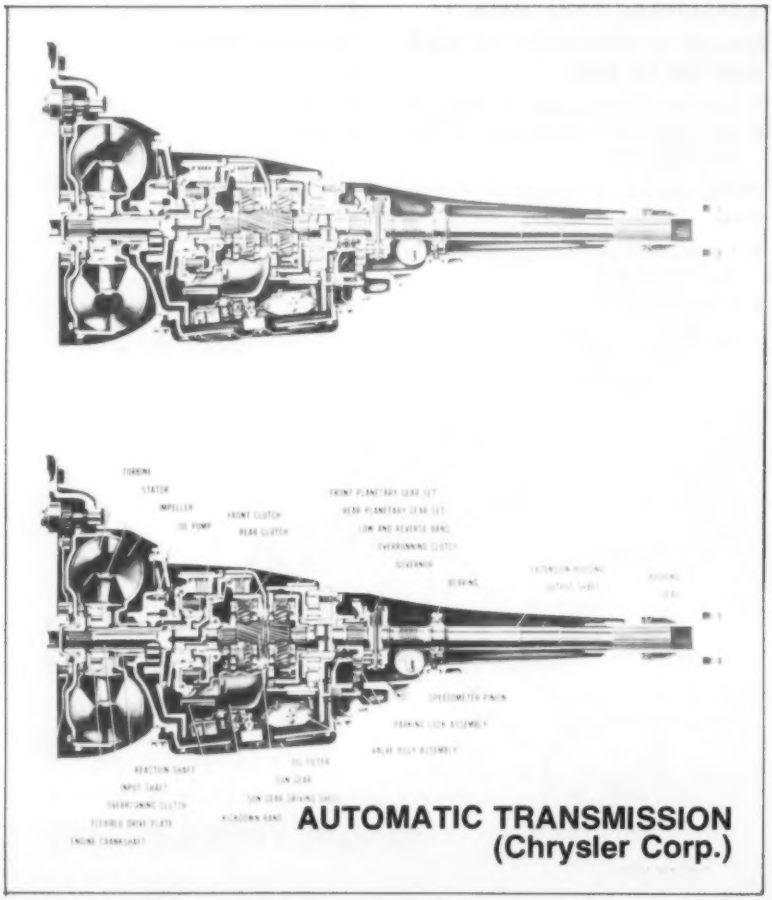
Drive shaft(s) bushing(s) damaged

Buzzing

- Valve body malfunction or leakage
- Oil pump faulty
- Overrunning clutch inner race damaged

Loud clatter during lock-up engagement (cold)

- Torque converter faulty
- Locking clutch failed
- Turbine hub seal leaking



AUTOMATIC TRANSMISSION (Chrysler Corp.)

FORD MOTOR CO.

Chatters in reverse (forward ok)

- Propeller shaft, "U" joints or engine mounts loose
- Reverse band out of adjustment

(C3, C4 & FMX only)

- Reverse clutch damaged or worn

(C6 & Jatco only)

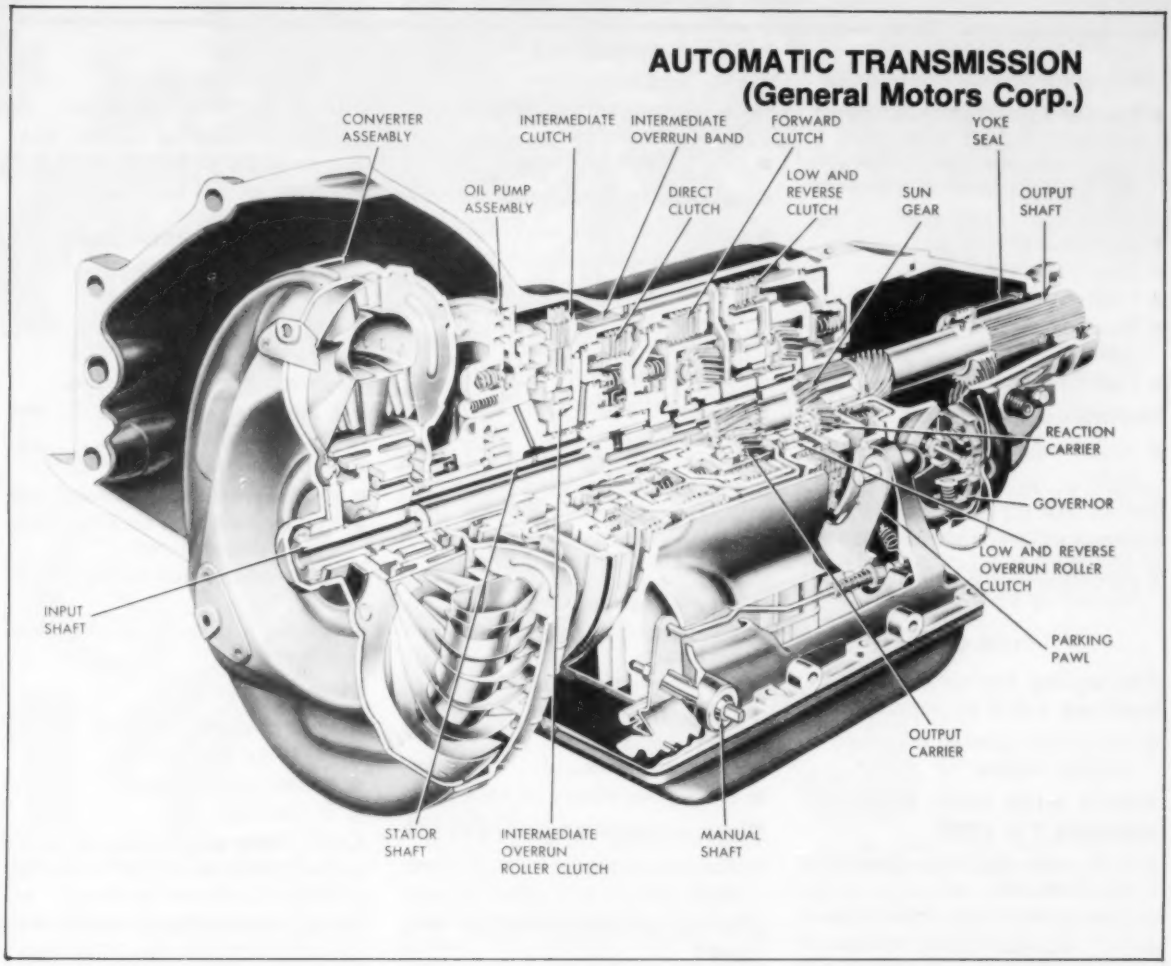
- Hydraulic pressures incorrect
- Reverse clutch or servo damaged or worn
- Valve body loose
- Valve body sticking or dirty

Chatters in first gear in "D", other gears OK; first gear in "OD"; or "3" (A.O.T. only)

- One-way clutch damaged or worn

Chatters in second gear

- Intermediate friction clutch or one-way clutch damaged or worn (A.O.T. only)
- Intermediate band out of adjustment (except A.O.T.)
- Clutch or band application improper
- Hydraulic pressures incorrect



- Servo damaged, worn or leaking
- Valve body dirty or sticking
- Intermediate band or drum polished or glazed

Valve resonance

- Clutch or band application improper
- Hydraulic pressures incorrect
- Cooler line grounding
- Valve body dirty or sticking
- Internal leakage
- Oil pump cavitation

Miscellaneous (other than valve resonance)

- Torque converter faulty
- Oil pump faulty
- Speedometer driven gear faulty
- Extension housing bushing or seal worn or damaged
- Propeller shaft faulty
- Planetary gear set faulty
- One-way clutch faulty

GENERAL MOTORS

THM 125

General noise

- Pump strainer plugged
- Pump parts damaged
- Roller bearing worn
- Transaxle grounded to body
- Differential and final drive unit defective (third gear or on turns)

THM 180

In all drive ranges

- Backlash between sun gear and planetary gears excessive
- Planetary carrier lock plate loose
- Thrust bearings worn
- Bearing bushings worn
- Transmission end play excessive
- Parking pawl spring touching governor hub
- Converter balancing weights loose
- Converter housing bolts loose and touching converter

Short vibrating, hissing shortly before 1-2 upshift

- Reverse clutch damping cushion wearing into case

Screeching noise when starting

- Torque converter defective

THM 250C

First, second and reverse gears

- Planetary gears damaged
- Thrust bearings damaged
- Planetary input and output ring gear damaged

"P", "N", and all "D" ranges noise

continued

continued

- Remove belts from water pump, generator and power steering to make sure they aren't causing noise before checking transmission
- Restricted strainer
- Damaged gaskets
- Pump porous
- Pump damaged or improperly assembled
- Converter damaged

During acceleration

- Transmission grounded to underbody
- Motor mounts loose or broken

Squeal at low vehicle speed

- Speedometer-driven gear shaft seal dry or damaged

THM 325

Thumping accompanied by hunting 1-2-1 at low speed

- Governor springs distorted or weights binding

Bump with soft, early, or slipping 1-2 shift

- T.V. cable incorrect, binding or disconnected
- Intermediate servo malfunction
- T.V. plunger, shift T.V. valve or 1-2 accumulator valve binding in valve body
- 1-2 accumulator malfunction
- Space plate and gaskets incorrect or gasket installed wrong
- 2nd, servo apply, or 1-2 accumulator passage in case porous
- Intermediate band burned

Bump with soft, early, or slipping 2-3 shift

- Intermediate servo malfunction
- Orifice plug missing from case in servo base area
- Servo assembly incorrect
- Direct clutch feed orifice in space plate restricted
- Spacer plate or gaskets incorrect
- Spacer plate gasket leaking, damaged or installed incorrectly
- Direct clutch case passage porous
- Driven sprocket support gasket or oil seal rings leaking, damaged or out of position
- Driven sprocket support passages interconnected
- Direct clutch malfunction

Chatters in first and slips

- Engine idle speed too high
- Governor malfunction
- Valve body 1-2 shift valve or 1-2 throttle valve sticking in upshift position

All ranges

- Pump cavitation caused by
  Screen plugged or restricted
  Screen "O" ring seal damaged
  Case intake area porous
  Water in oil
  Transmission intake port porous or void
- Oil pump gears damaged
- Oil pump driven gear installed backwards
- Oil pump crescent interference
- Converter-to-drive plate bolts loose
- Converter damaged
- Drive plate broken or cracked

First, second and/or reverse

- Planetary gear set worn or damaged

During acceleration (in any gear)

- Transmission or oil cooler lines grounded to body
- Motor mount loose or broken

Popcorn popping during acceleration (in any gear)

- Drive link assembly worn or damaged

Squeal at low vehicle speed (especially when hot)

- Speedometer-driven gear shaft seal worn or damaged

THM 350 & 350C

All ranges

- Pump cavitation or damage
- Converter-to-drive plate bolts loose
- Converter damaged

First, second and/or reverse

- Planetary gears or thrust bearings damaged
- Input or output ring gear damaged

During acceleration

- Transmission or cooler lines grounded to underbody
- Engine mounts loose or broken

Squeal at low vehicle speed

- Speedometer-driven gear shaft seal dry
- Speedometer-driven gear damaged
- Governor assembly missing
- 1-1 shift valve or 1-2 throttle valve stuck
- Case channels porous
- Second speed feed holes undrilled
- Intermediate band anchor pin missing or disconnected
- Intermediate band broken or missing
- Intermediate servo assembly malfunction

Pump noise

- Filter plugged or leaking
- "O" ring damaged
- Intake circuit porous
- Water in oil
- Oil pump gears worn, installed backwards or crescent interference

First, second and/or reverse

- Transmission grounded to body
- Planetary gear set worn or damaged
- Thrust bearings or races worn

Clutch noise during application

- (In "N", "P", or "D") Forward clutch plates worn
- (1-2 shift) Intermediate clutch plates worn
- (2-3 shift, "N", "P", or "R") Direct clutch plates worn

Converter noise

- Needle bearings in converter damaged

Next month we'll listen to noises unique to certain cars and attempt to diagnose them. American Motors, Chrysler Corporation and Ford Motor Company vehicles will be providing the noise; General Motors cars will be heard from the month after next.

CARBURETOR Fires

Have you ever tried starting a car after you ran out of gas by pouring gasoline into the carburetor while someone else cranked the engine? If so, congratulations.

Congratulations for your luck, not only in being alive but in being able to see. The fact is that pouring gas into the carburetor is worse than wrong — it's dangerous.

Here are some recent examples of what can happen.

1

An airman poured fuel into his carburetor while a friend started the car. The engine backfired through the carburetor, blowing gasoline and flames over the airman's neck and shoulders. He received some third-degree burns and lost 18 days from work.

2

In another case, two Navy members were trying the same maneuver, using a coffee can containing gas. Again, the car backfired and the gas ignited. The member with the can threw it away and the burning gasoline hit three small girls who were watching the work. The two members put out the fire on the children's clothing with a blanket and a pair of coveralls. The two members received burns on their arms while putting out the fire. One of the girls had burns on 45 percent of her body, and another had burns over 25 percent of her body.

3

In the third case, three civil servants at an overseas base were working on a gasoline engine in a pump station. The particulars are the same: One tried starting the engine, another poured gasoline into the carburetor, and the third stood by, watching. The engine backfired, igniting the gas, the pourer threw the container away, and it splattered the third man. The third man ran outside with his clothes flaming and rolled in a snowbank to put out the fire. The man who had poured the gas followed him outside and finished putting out the flames with his bare hands. He received second-degree burns on his hands. The third man had second- and third-degree burns over 50 percent of his body, and some respiratory burns. He died 21 days later.

So now you see what we mean by "congratulations." You were lucky you weren't burned.

But it was also a dumb move, since you don't need to pour gasoline into the carb. If the carburetor isn't getting gasoline there is some problem, perhaps with the fuel pump, that must be fixed before the car will start. If it is getting gas but isn't firing, you won't solve the problem by adding more gasoline to the carburetor. Worse, you'll risk pouring gas onto something hot and setting it — and yourself — afire.

One more thing — never look down a carb while the engine is being cranked, even if you are not pouring gasoline into it. The motor could backfire at any time through the carburetor and you'd be there to get a facefull.

LETTERS to the EDITOR — BACKFIRE

UNDELIVERABLE MAIL TO CORRESPONDENTS

DRIVER receives many letters with no return address on the letter and sometimes none on the envelope either. We would appreciate your return address on every letter so that we can reply.

We tried to answer a letter recently but it was returned to us for insufficient address. So here goes the answer to A1C Lynn H. Gretten, McGuire AFB, NJ 08641:

Nothing in this world is 100%, and that includes seatbelts. But the statistics are overwhelming in showing that your chances of living through a crash are much greater if you're belted in. A highway patrolman said the other day, "In all my years of experience with being on the scene after accidents, I've never unbuckled a dead person."

We're glad to hear that, even though you have some doubts, you do wear seatbelts. The odds really are with you because you do so.

The Editor

RIGHT TURN ON RED (RTOR)

In your fine magazine of June 1981 you had a "Timely Topic" about "Right Turn On Red (RTOR)" being blamed for a 20% increase in right-turn accidents. How does the law (a mere piece of paper) get the blame? Does it require the driver to turn right within three to five seconds after stopping regardless of traffic conditions? That would certainly put the law at blame.

Did the RTOR accident rate increase in California in the past few years? That would be strange because California has had such a law since horse riders turned right at red lights in the old west. No, I doubt that the law is to blame — but WHO IS?

To start with, I think we can blame the Insurance Institute for Highway Safety and Moshman Associates, Inc. This kind of study only perpetuates a prevalent attitude among Americans as a whole (all other modern societies too!). That attitude is to blame everything but yourself:

1. I turned right and hit a pedestrian because the sun was in my eyes.
2. I didn't see the car because there was a big truck in the way.
3. I tried to accelerate and merge with the traffic and hit the car in front of me.
4. The law confuses me.
5. I was talking to my passenger.

Whom or what are you going to blame when it happens to you? In AFP 50-34 (1 Aug 80) Chapter 9, page 9-4 it says: "Accident records generally show that 88% are caused by unsafe acts of people and 10% by unsafe conditions which people allow to exist." Don't get me wrong, if I make the mistake I'll blame something too. It will reduce my social penalty — I'll know better though.

I just get tired of highly educated people doing studies (usually with my tax money) just so humans can have something other than themselves to blame their own carelessness on. Why don't we just blame it all on improper potty training, open the prisons, and then we can all get back to maiming and killing and we have a ready-made excuse.

MSgt Charles L. Morris, USAF
APO New York 09238

Basically the "new" RTOR laws provide a "loophole" that drivers are interpreting too loosely. Some drivers just plain aren't following basic safety rules when executing the maneuver. Yes, the law is to blame. Without the new RTOR law these same drivers would never have thought of attempting the turn. That doesn't make the law wrong; the law only contributes to an already dangerous situation.

As a side note, I doubt that California or any other area that always had an RTOR law was used in the study data, since there would have been no "before" to compare with. The study probably didn't cost a lot since it is merely a comparison of existing data.

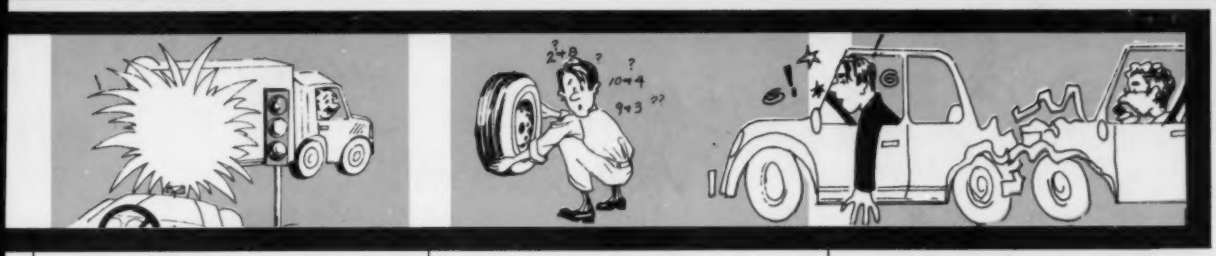
PERSONAL JUDGMENT

I enjoy very much reading your magazine and find it very informative. However, I recently read your August issue and was extremely shaken. I got chills throughout my entire body. I refer to the two photos in the lower right of page 24. These photos show the person removing and replacing the tire with his hands at the top and bottom of the tire (12 and 6 o'clock). I cannot recommend too strongly that you reprint these photos showing the tire being handled with the hands at 10 and 4, 9 and 3, or 2 and 8 o'clock position.

I suggest this change because several years ago I was returning to base with two friends at 3 a.m. We were driving on the Pennsylvania Turnpike. We passed a man parked on the side of the road changing a flat. This was a very dark location and we almost didn't notice the man wave to us. We realized he was in trouble and backed up to help. The man was accompanied by his 9-year-old son.

While changing the tire, with his hand on top of the tire, the car fell off the jack catching the man's hand between the frame and tire. We extricated the man's hand, changed his flat, and drove him and his car to the next rest area where we administered first aid. The man had been in that position for over a half-hour before we came along.

Since that incident I have completed a 25-year career in law enforcement and shudder every time I see anyone change a tire in this fash-



ion or even see a photo such as the one you published.

I hope you will give my recommendations serious consideration and print a correction to these photos.

Lt Col Edward F. Webster, USAFR
Philadelphia, PA 19124

The safety precautions that preceded this tire-changing were extensive. They included: finding a level place; setting the parking brake; placing wheel chocks; and placing the jack on firm ground, making sure it was perfectly vertical. Our text also included directions about placing a six-inch section of two-by-four under the jack base to keep it from sinking into loose soil.

You're right. There is very real danger of hurting the hands if they are placed incorrectly, and as cars get smaller there's less and less clearance. Seems that nothing is as easy as it used to be.

SEAT BELTS, YES
MANDATORY LAW, NO

As a result of my experience in two virtually identical accidents, I am a firm believer in wearing seat belts. In both cases I was stopped at a red light and struck from behind by a car doing about 15 mph — not much I could have done in the way of defensive driving. In the first, in a Plymouth sedan with no seat belts, I was thrown forward over the wheel, cracked a couple of ribs, and hit my head on the windshield. I was sore for weeks. In the second, in a VW Beetle with shoulder belts, the only after-effect I experienced was a scratch on my finger from straightening out a bent tailpipe.

While all my subsequent driving experience has further reinforced my faith in seat belts, I am nevertheless opposed to mandatory seat belt laws. There are too many people around who believe that the instant solution to any problem is another government regulation. The Ralph Nader mentality, the "Big-Brother-knows-best" philosophy, is responsible for causing more problems than it solves. I prefer the thrust of the German approach in which the individual involved in an accident not wearing seat belts is considered guilty of contributory negligence and his right to claim from his insurance company for his own injury or damages limited accordingly. This provides a potent incentive for the individual to take responsibility for his own actions, something we don't emphasize enough in the safety business. A wise man once said that the inevitable result of attempting to shield men from the effects of their own folly was to people the world with fools.

CMSgt George Reeve, USAF
APO New York 09755

Maybe if the U.S. enacted a mandatory seatbelt law we'd pull the country out of the red. Heck, if the Swiss could save $42 billion, we might be able to garnish some sense ourselves.

SSgt Kurt Hardebeck, USAF
Grissom AFB, IN 46971

In reply to your column, "Should There Be A Law?" I'm sure a lot of people would get "cranky" about seatbelt laws, but I think they would be a good idea. As for resenting the state or nation telling us what to do in our own cars: We're already required to have our cars properly registered and to be licensed ourselves in order to operate them. The German rule you mentioned that presumes unbelted motorists injured in accidents are negligent seems like a sensible one to me. However, I can't say the same about the German's lack of speed limits on the Autobahn!

Ms. Mavis L. Nelson, USAF
Grand Forks, ND 58201

USE OF SEATBELTS

Yes, we should have a mandatory safety belt law. When? Not until manufacturers produce vehicles with restraint devices that can be easily fastened and are adjustable to fit the driver and passengers comfortably.

I've spent a number of hours recently making checks of safety belt usage. The major reasons given by many of the nonusers were: "They are too uncomfortable." "They rub my neck raw." "They are a d--- nuisance to put on." Granted, these are excuses, but I believe in the main, the individuals who so believe are rational, intelligent people who probably would wear them regularly if they were adjustable for a range of sizes and shapes of human beings.

Ironically, because of discomfort, some drivers and passengers who *were* using safety belts wore the shoulder belt under the armpit because the correct way proved to be so irritating. This could result in serious injury, even death.

If safety belt use is to be mandatory, let's have restraint devices that are comfortable and don't require the potential user to be a contortionist. Try fastening some of these devices when dolled up in mittens or heavy gloves and while wearing a parka or a heavy overcoat.

Do I wear 'em? You bet your boots I do! Do I like 'em? H--- no!

Mr. Carl F. Pommer,USAF
Hancock Field, NY 13225

So far, our response from readers is running heavily toward the German system: If you're injured in an accident and weren't belted in you're assumed to be guilty of negligence.

☆U.S. GOVERNMENT PRINTING OFFICE: 1982 583—021/1000

CUSS!
CUSS CUSS!
EXPLETIVE!
SWEAR
SCREECH!
TOING
Y' GOT 'IM RED!
MAN-OH-MAN! LISTEN TO THAT HOCKEY-PUCK CUSS!
HE HATES YOU, RED...
TRUE, BUT HE LUVS ME-E-E
ANYBODY THAT IMPATIENT SHOULD START OUT 10 MINUTES EARLY TO GET TO WHERE HE'S GOIN'...
YEAH!
...OR DRIVE AHEAD SO HE'S SURE TO MEET UP WITH ME-E-E
...'CAUSE WHEN IT'S TIME FOR ME TO STOP 'EM, I'M-A-GONNA STOP 'EM!
YEAH!
YOU'RE ONLY DOING YOUR JOB, RED, DEAR.
MS GREEN, IF YOU'LL STAY OUTTA THIS, I'LL FIX THAT YO-YO.
DO IT RED! NOBODY SHOULD SWEAR LIKE THAT IN FRONT OF A LADY!
YES, RED! FIX HIS ★!/★★! WAGON, DEAR!
ON YER MARK, GIT SET...
TOING
Don't go through that intersection
...'til you're sure
...THE LIGHTS ARE ON
YOUR SIDE
KELLEHER